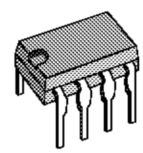
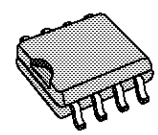
ELECTRONIC TWO - TONE RINGER

- LOW CURRENT CONSUMPTION, IN ORDER TO ALLOW THE PARALLEL OPERATION OF 4 DEVICES
- INTEGRATED RECTIFIER BRIDGE WITH ZENER DIODES TO PROTECT AGAINST OVERVOLTAGES
- LITTLE EXTERNAL CIRCUITRY
- TONE AND SWITCHING FREQUENCIES ADJUSTABLE BY EXTERNAL COMPONENTS
- INTEGRATED VOLTAGE AND CURRENT HYSTERESIS



Minidip



SO8

DESCRIPTION

LS1240 and LS1240A are monolithic integrated circuits designed to replace the mechanical bell in telephone sets in connection with an electro-acoustical converter. Both devices can drive directly a piezo-ceramic converter (buzzer).

The output current capability of LS1240A is higher than LS1240. For driving a dynamic loudspeaker LS1240 needs a transformer, while LS1240A, needs a decoupling capacitor.

No current limitation is provided on the output stage of LS1240A, so a minimum load DC of 50 Ω is adviced.

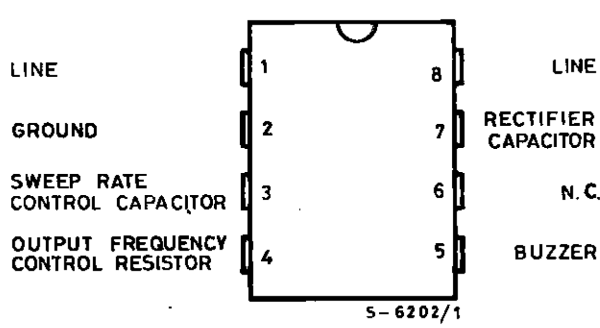
The two tone frequencies generated are switched by an internal oscillator in a fast sequence and made audible across an output amplifier in the loudspeaker, both tone frequencies and the switching frequency can be externally adjusted.

ORDERING NUMBERS

Minidip	SO8
LS1240 LS1240A	– LS1240AD1

The supply voltage is obtained from the AC ring signal and the circuit is designed so that noise on the line or variations of the ringing signal cannot affect correct operation of the device.

PIN CONNECTION (top view)



BLOCK DIAGRAM

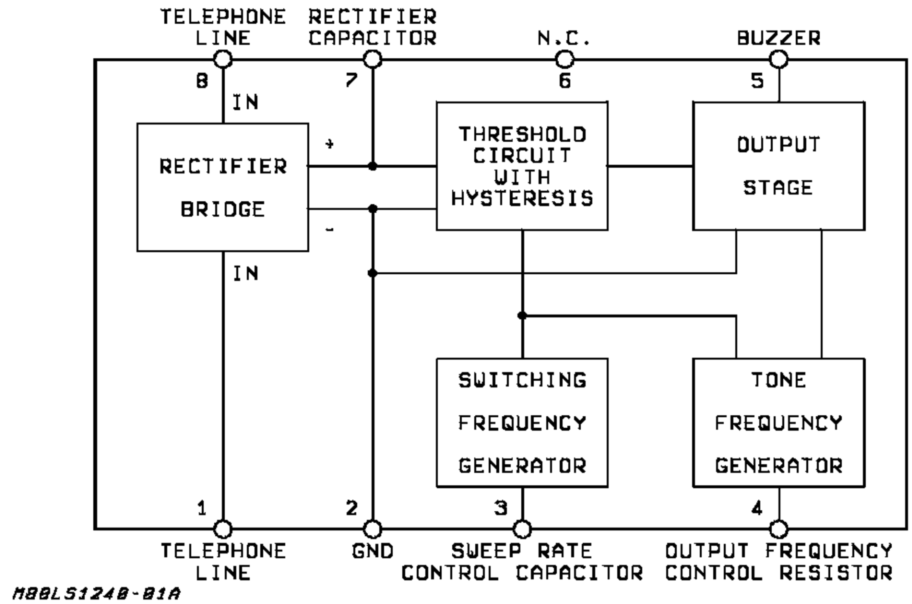
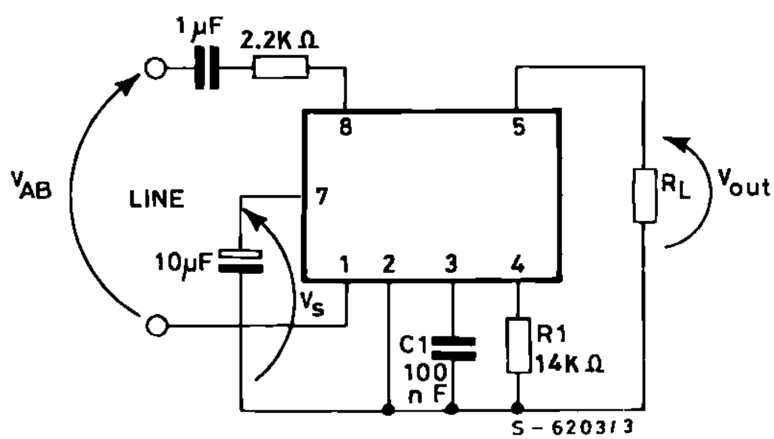


Figure 1 : Test Circuit.



$$R1 = \frac{2.72 \cdot 10^4}{f1\ (Hz)} \cdot \left(1 - 0.04 \ln \frac{f1}{1943}\right) \qquad f2 = 0.725\, f1 \qquad f_{SWEEP} = \frac{750}{C1\ (nF)}$$

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{AB}	Calling Voltage (f = 50 Hz) Continuous	120	V_{rms}
V_{AB}	Calling Voltage (f = 50 Hz) 5s ON/10s OFF	200	V_{rms}
DC	Supply Current	30	mA
T_{op}	Operating Temperature	– 20 to + 70	°C
T_{stg}	Storage and Junction Temperature	– 65 to + 150	°C

THERMAL DATA

Symbol	Parameter	Value	Unit
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-ambient Max	100	°C/W

ELECTRICAL CHARACTERISTICS
(T_{amb} = 25 °C; V_s = applied between pins 7-2 unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_s	Supply Voltage				26	V
I_B	Current Consumption without Load (pins 8-1)	$V_{8\text{-}1}$ = 9.3 to 25 V		1.5	1.8	mA
V_{ON}	Activation Voltage LS1240 LS1240A		12.2 12		13.2 13.5	V V
V_{OFF}	Sustaining Voltage LS1240 LS1240A		8 7.8		9 9.3	V V
R_D	Differential Resistance in OFF Condition (pins 8-1)		6.4			kΩ
V_{OUT}	Output Voltage Swing			V_s – 5		V
I_{OUT}	Short Circuit Current (pins 5-2) LS1240 LS1240A	V_s = 20V R_L = 0Ω R_L = 250Ω		35 70		mA mA

AC OPERATION

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
 f_1 f_2	Output Frequencies f_{out1} f_{out2}	V_s = 26V, R_1 = 14kΩ V_s = 0 V V_s = 6V	 1.74 1.22		 2.14 1.6	kHz
	$\frac{f_{OUT1}}{f_{OUT2}}$		1.33		1.43	
	Programming Resistor Range		8		56	kΩ
f_{SWEEP}	Sweep Frequency	R_1 = 14kΩ, C_1 = 100nF	5.25	7.5	9.75	Hz

Figure 2 : Typical Application for LS1240 and LS1240A

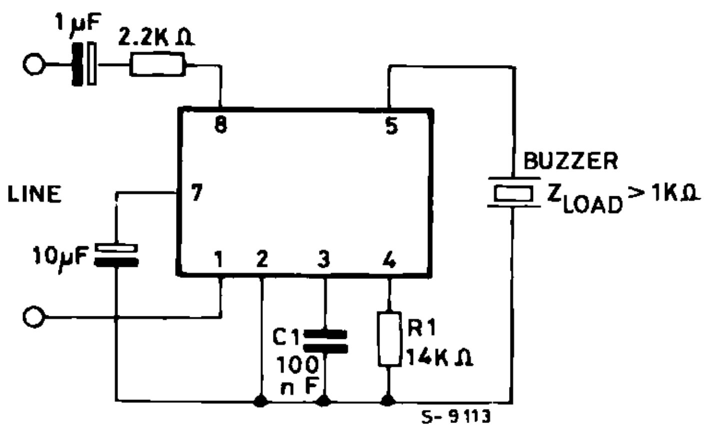
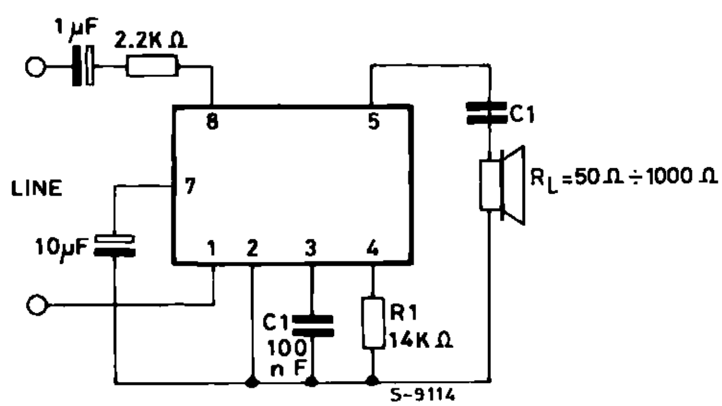


Figure 3 : Typical Application for LS1240A only.

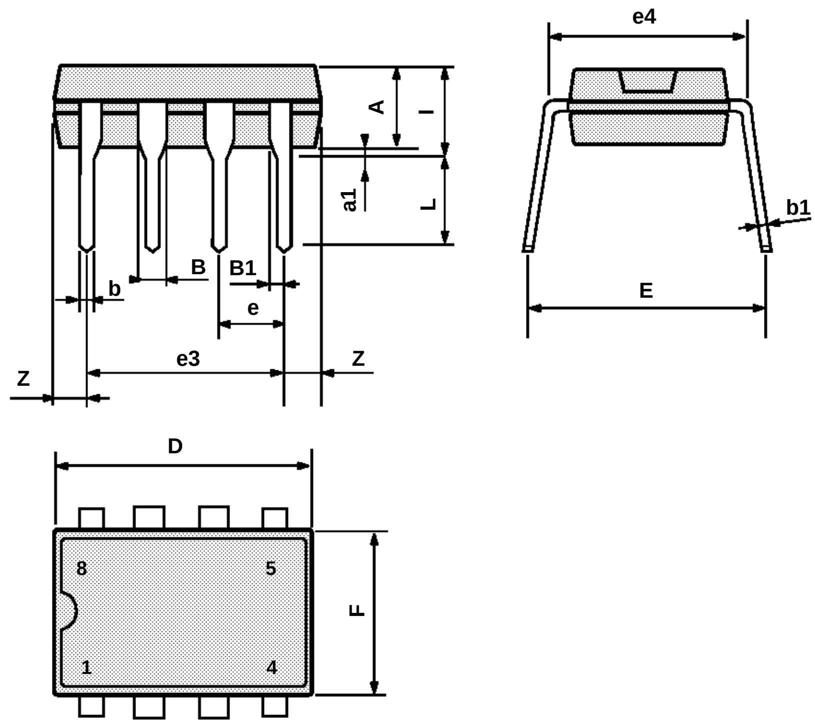


C_1 such that $|Z_{LOAD}| > 1\ K\Omega$

MINIDIP PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A		3.32			0.131	
a1	0.51			0.020		
B	1.15		1.65	0.045		0.065
b	0.356		0.55	0.014		0.022
b1	0.204		0.304	0.008		0.012
D			10.92			0.430
E	7.95		9.75	0.313		0.384
e		2.54			0.100	
e3		7.62			0.300	
e4		7.62			0.300	
F			6.6			0260
i			5.08			0.200
L	3.18		3.81	0.125		0.150
Z			1.52			0.060

DIP8.TBL

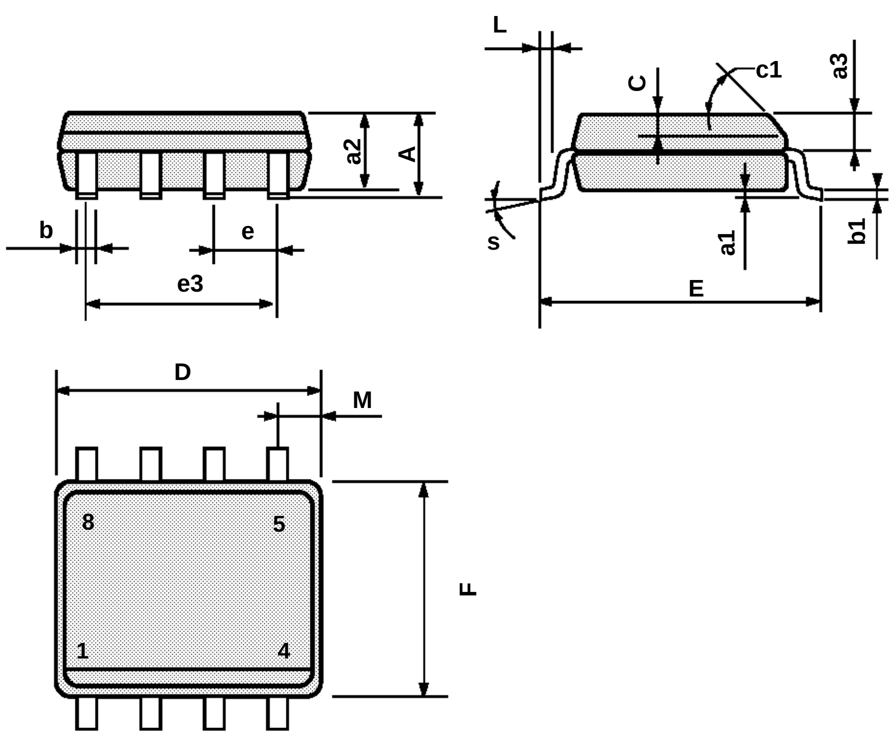


PM-DIP8.EPS

SO8 PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.75			0.069
a1	0.1		0.25	0.004		0.010
a2			1.65			0.065
a3	0.65		0.85	0.026		0.033
b	0.35		0.48	0.014		0.019
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.020
c1	45^{o} (typ.)					
D	4.8		5.0	0.189		0.197
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F	3.8		4.0	0.150		0.157
L	0.4		1.27	0.016		0.050
M			0.6			0.024
S	8^{o} (max.)					

SO8.TBL



PM-SO8.EPS